## REMARKS

### I. Introduction

The Office Action mailed February 25, 2008, has been carefully considered. The present Amendment is intended to be a complete response thereto and to place the case in condition for allowance.

### II. Status of Claims

Claims 1-25 are pending. Claims 1-18 have been withdrawn from consideration by the Examiner as being drawn to non-elected inventions. Claim 19 has been amended. Support for the amendment is found, *inter alia*, in the specification on page 11, lines 11-17.

### III. Summary of the Office Action

In the Final Office Action, the Examiner rejects claims 19-24 stand rejected under 35 U.S.C. §103(a) as being obvious over Landers et al. (U.S. Patent No. 6,210,882) in view of Murphy et al. (U.S. Patent No. 5,381,229).

### IV. Arguments

Applicant respectfully traverses the rejections. The cited references, taken alone or in combination, fail to disclose every element of the claimed invention. First, the references fail to disclose measuring the temperature of a sample in a closed reservoir with an optical interferometric sensor, as recited by claim 19. This has been argued in the Amendment filed October 18, 2007. Applicants incorporate those arguments herein.

In the Final Office Action, the Examiner alleges that

> Applicant's arguments that Landers fails to disclose measuring the temperature of a sample in a closed reservoir with an optical interferometric sensor, as recited by claim 19, are not persuasive since Landers discloses that the sample is in a reservoir (14) that is closed (by 12) (see figure 1D). The excerpts from Landers that the Applicant relies upon, i.e., and "open reaction vessel", is merely an alternate embodiment of his invention, which was not used in the rejection of claim 19.

*See* pages 4-5. The Examiner's allegation unreasonably stretches the teaching of Landers beyond its actual disclosure. First, Landers only discloses the use of the optical sensor with an open reaction vessel in column 15, lines 40-44. The Examiner is correct in her allegation that Landers discloses a closed reservoir in Figure 1D, however, nowhere in his specification does he disclose the use of a thermo-optical sensing device with this embodiment. The only embodiment that Landers discloses the use of the remote temperature sensor is with an open reaction vessel. In column 15, lines 40-44, Landers et al. specifically states:

> a thermo-optical sensing device can be placed above an open reaction vessel containing the sample being thermocycled. Such a device can sense the temperature on a surface, here the surface of the sample, when positioned remotely from the sample.

(emphasis added). Nowhere else does Landers teach the use of a thermo-optical sensing device to measure temperature of a closed reservoir. The Examiner is correct in noting that the open vessel is only an embodiment of Landers' invention; however, this is the only embodiment that is disclosed with the use of a thermo-optical sensing device. Landers specifically discloses that "a thermo-optical sensing device can be placed above an open reaction vessel." *Id.* If Landers intends for his thermo-optical sensing device to be used with any reaction, he would not have specified "an open reaction vessel," and would have used the generic description "a reaction vessel" instead. That, however, is not the case; and the Examiner has not been able to specifically point to any passages in Landers supporting her broad reading of the reference.

On page 5 of the Final Office Action, the Examiner tries to cobble together several passages in Landers (specifically column 8, lines 45-63; column 15, lines 37-43; and column 16, lines 59-63) to support her position that Landers discloses "that the thermo-optical sensing device is used with any of the disclosed sample containers." However, none of the cited passages support that outlandish allegation. Column 8, lines 45-63, discloses reaction vessels in general for thermal cycling. There is no disclosure of a thermo-optical sensing device here. Column 15, lines 37-43, discloses that "a thermo-optical sensing device can be placed above an open reaction vessel." There is no disclosure that this thermo-optical sensing device can be used with any other vessel. Column 16, lines 59-63, discloses that

> FIGS. 6C and 6D depict an embodiment using only one entrenched reservoir 174 containing sample 172 within microchip 176. A thermo-optical sensing device 178 is positioned above the sample 174 in entrenched reservoir 172.

FIGS. 6C and 6D show an open reaction vessel. This is consistent with the disclosure in column 15, lines 37-43. Thus, the Examiner's allegation that "the thermo-optical sensing device is used with any of the disclosed sample containers" is not consistent with the actual disclosure of Landers.

Additionally, on page 5 of the Final Office Action, the Examiner alleges that

> Landers discloses that the material of the window is transparent to radiation so that the radiation transmits through the window and reaches the sample. Therefore, the thermo-optical sensing device doe not measure the temperature of the cover plate since the window is transmissive. Because of the window's transparency, the thermo-optical device measures the temperature of the sample in the closed reservoir versus the temperature of the cover plate.

This again shows the Examiner's desperate attempt to stretch the disclosure of Landers. Assuming that the Examiner's allegation is correct, the solution would also be transparent (which is the basis of the present invention), which means that the light would transmit through the

solution and be reflected from the bottom of the reservoir (assuming that surface is not completely transparent). By following the teaching of Landers and of Murphy et al., the temperature measure would then be that of the bottom surface of the reservoir, not of the sample between the cover and the bottom surface. If the bottom reservoir is also transparent, then there would be no reflection and no temperature can be measured. Thus, even if the Examiner's theory that light would be completely transmitted through the cover plate is true, the temperature measured using the teachings of Landers and of Murphy et al. would not be that of the sample in the reservoir.

Finally, in the Final Office Action, the Examiner alleges that

> Applicant's arguments that Landers and Murphy do not teach measuring the temperature of a sample in a closed reservoir under a cover plate because they both measure the surface of the sample are not persuasive since the surface of the sample is the same thing as "measuring the temperature a sample in the reservoir,["] as claimed.

*See* page 5 (emphasis added). Applicants respectfully submit that this analysis is completely wrong. The temperature of the surface is not the same as the temperature in the reservoir. Applicants respectfully refer the Examiner to Figure 8 of the present specification. The temperature of the surface is the temperature of the cover plate 74 closest to the probe 80, while the temperature in the reservoir is the temperature inside the channel 72. These locations are different and cannot be said to be "the same thing." At certain specific conditions, such as at steady state, the temperature at those different locations may be the same. However, considering that the most common use for the present method never reaches steady state (see, e.g., Figure 9), the location of the temperature measurement is important.

Second, the references fail to disclose "interrogating the small volume with the optical interferometric sensor to obtain a refractive index of the small volume" as recited in claim 19.

Obtaining a refractive index of the small volume is not disclosed by either Landers or by Murphy et al. On the contrary, Murphy et al. disclose

> The optical fringes are related to changes in optical path length. Such changes in optical path length may be due to displacements of the surface which, in turn, can provide an indirect measurement of pressure, strain, acoustic waves, or temperature of the surface.

*See* page 4, lines 4-8. Thus, the optical interferometer of Murphy et al. measures the displacement of a surface and correlates that displacement with a temperature. Thus, that method obtains the temperature of that surface. However, if the method of Murphy et al. is applied to the closed reaction vessel of Landers, the temperature measured would be that of the top surface of the cover glass. If that cover glass is transparent, as alleged by the Examiner on page 5 of the Final Office Action, the temperature measured would be that of the bottom surface of the reaction vessel. If the Examiner alleges that the bottom surface is also transparent, no temperature would be measured as there would be no reflectance.

On the contrary, the present invention measures the temperature of the sample located between the cover glass and the bottom of the reaction vessel by measuring the refractive index of the sample contained within this reservoir. Therefore, by relying on the refractive index of that volume, the present invention is able to accurately measure the temperature of that volume, rather than the temperature of the cover glass or the bottom surface. That is not disclosed by either Landers or Murphy et al.

Therefore, for the reasons noted, the combination of Landers et al. and Murphy et al. does not render the claims of the present invention obvious. Accordingly, Applicants respectfully request withdrawal of the rejection.

## V. Conclusion

Applicants have responded to the Final Office Action mailed February 25, 2008. All pending claims are now believed to be allowable and favorable action is respectfully requested.

In the event that there are any questions relating to this Amendment or to the application in general, it would be appreciated if the examiner would telephone the undersigned attorney concerning such questions so that the prosecution of this application may be expedited.

Please charge any shortage or credit any overpayment of fees to BLANK ROME LLP, Deposit Account No. 23-2185 (119620-00101). In the event that a petition for an extension of time is required to be submitted herewith and in the event that a separate petition does not accompany this response, Applicants hereby petition under 37 C.F.R. 1.136(a) for an extension of time for as many months as are required to render this submission timely.

Any fees due are authorized above.

Respectfully submitted,

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